



NOAA's Joint Polar Satellite System's

Breakout Session

Proving Ground and Risk Reduction Initiatives

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19 July 2017





Outline

- Introduction
- Breakout Objectives
- PGRR Background
- PGRR Proving Ground Initiatives
- Periodic Initiative Reporting
- Discussion Questions
- Summary



Breakout Objectives

- Provide background on the JPSS Initiative Program.
- Provide information on specific initiatives.
- Determine if participation in JPSS Initiatives would be helpful to them to meet their mission.
- Discuss if the JPSS Program has provided sufficient background information to effectively use its capabilities (to include training).
- Collect feedback on initiatives to evaluate for future program changes.
- Determine if the JPSS Initiative approach could be replicated in other meteorological communities.

JPSS PGRR Background Definitions



- **Proving Ground**

- Demonstration and utilization of data products by the end-user operational unit, such as a NWS Weather Forecast Office or Modeling Center.
- Promote outreach and coordination of new products with the end users, incorporating their feedback for product improvements

- **Risk Reduction**

- Development of new research and applications to maximize the benefits of JPSS satellite data
 - Example - use of Day Night Band for improved fog and low visibility products at night, benefiting transportation industry.
- Encourages fusion of data/information from multiple satellite, models and in-situ data
- Primary work is done at the algorithm and application developer's institution.
- Address potential risk in algorithms and data products by testing alternative algorithms.

JPSS PGRR Background



- The PGRR Program was established in early 2012, following the launch of the Suomi National Polar Partnership (SNPP) satellite on 28 Oct 2011
- Call-for-Proposals (CFPs)
 - The initial CFP in Jan 2012 resulted in 100 teams providing Letters-of-Intent (LOIs) with nearly 40 projects selected for funding
 - A second PGRR Program CFP went out in Dec 2014. PGRR Initiatives were used as a focus for the responses to this CFP. Over 130 LOIs were received.
- These proposals went through a rigorous user-led selection – between 40-50 projects selected for funding each time
- Project managers work with the users to determine how best to use new JPSS data, and to quickly transition these capabilities to operations.

PGRR Proving Ground Initiatives Responding to User Feedback



- The River Ice and Flooding Initiative was the first attempt at this new partnership and it was established in response to Galena AK flooding in May 2013.
- The Initiative included River Ice and River Flooding Project teams, direct broadcast SMEs, and National Weather Service River Forecast Center forecasters.
- The success of River Ice and Flooding Initiative led to creation of other initiatives that guided the 2014 PGRR CFP.
- Initiatives have proven to be critical forums where JPSS personnel, product developers, and users interact. The effort is to evaluate current and future JPSS Capabilities in operational environments to determine which of these capabilities should be transitioned to operations.

PGRR Proving Ground Initiatives Partial List





PGRR Initiatives

Initiative	Start Date
River Ice and Flooding	November 2013
Fire and Smoke	May 2014
Sounding Applications NOAA Unique CrIS/ATMS Processing System (NUCAPS)	July 2014
OCONUS and NCEP Service Centers AWIPS Initiative	June 2015
Hydrology	July 2015
Ocean and Coastal	March 2016
Severe Weather/NWP/Data Assimilation	March 2016
Arctic Initiative	June 2016

PGRR Proving Ground Initiatives Partners



PGRR Proving Ground Initiatives Best Practices



NUCAPS Initiative Initial Objectives



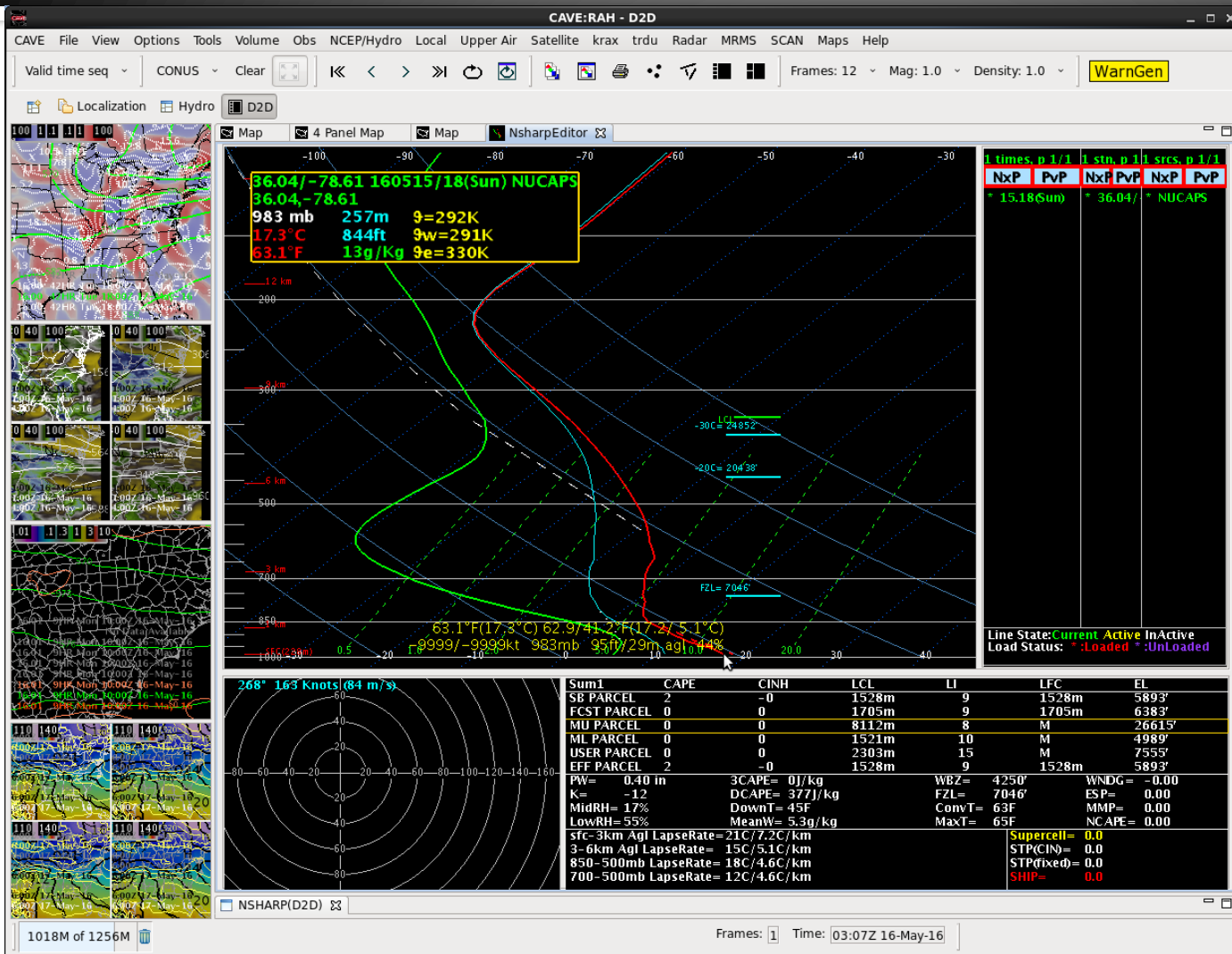
- Organize a forum to allow stakeholder supporting NUCAPS development to interact with key users of the capabilities.
- Evaluate how NUCAPS soundings will look in AWIPS II and work to get field the correct visualization showing the soundings' Quality Control (G, Y, R).
- Discuss actions to prepare for a ops demo for Cold Air Aloft in AK during Winter 2014-2015
- Discuss actions needed to evaluate NUCAPS in HWT Spring Experiment 2015.
- Establish NUCAPS Training for WFO that currently have NUCAPS and have the training available for those WFOs upgrading to AWIPS II. Training would be a module in the Commerce Learning Center.
- Work to justify and then implement NUCAPS pre/post-processor for Metop-A/B AMSU/MHS/IASI. This allows NUCAPS products to be available at both 9:30 and 13:30 overpasses.
- As the Initiative Team met over the months and years, actions were taken to implement these objectives, and new objectives were identified and worked.

Initiative Participants



Name	Organization	Name	Organization
Chris Barnet	STC	AK Sharma	STAR
Emily Berndt	SPoRT	Bill Sjoberg	JPSS
Jack Dostalek	CIRA	Nadia Smith	CIMSS
Antonia Gambacorta	STAR	Eric Stevens	GINA
Chad Graville	NWS	Jorel Torres	JPSS Training Liaison
Brian Motta	NWS	Elisabeth Weisz	CCMIS
Nick Nalli	STAR	Ashley Wheeler	STC
Kim Rink	NWS	Brad Zavodsky	SPoRT

NUCAPS in AWIPS – Skew Ts



High vertical information content

Allows comparison to Radiosondes and Model soundings

But...

- Which dot to click on?
- NOT visible in Volume Browser

Initiative Activities

- Cold Air Aloft in AK – when air is colder than -65F jet fuel begins to jell.
- Operational testing of NUCAPS in convective environments in CONUS and Alaska.
- Worked to create an IASI NUCAPS Products to take advantage of MetOp early morning orbits.
- Evaluated NUCAPS in three consecutive Spring Experiments at the Hazardous Weather Testbed in Norman OK.
- Provided NUCAPS soundings for aircraft operations in several CalWater Experiments.
- Evaluated use of NUCAPS during Pineapple Express Atmospheric Event.
- Participated in El Nino Rapid Response Field Campaign.
- Used NUCAPS to study extratropical transition of tropical cyclones and hurricanes.
- And more.....

Fire and Smoke Initiative Initial Objectives



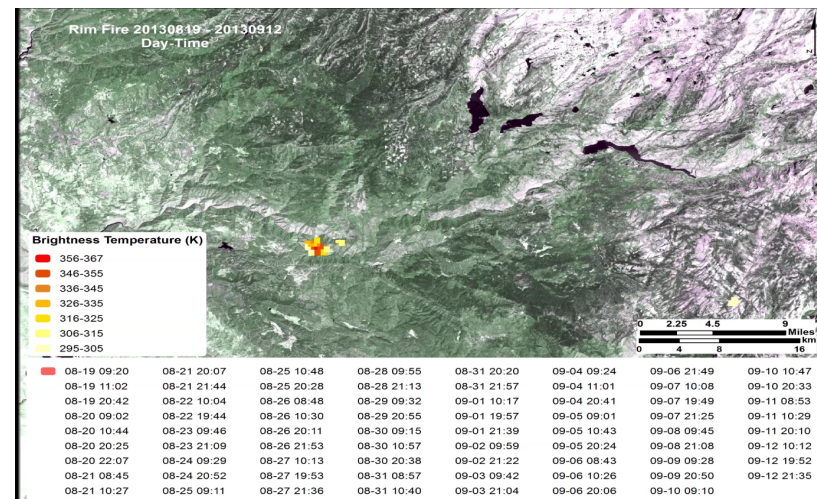
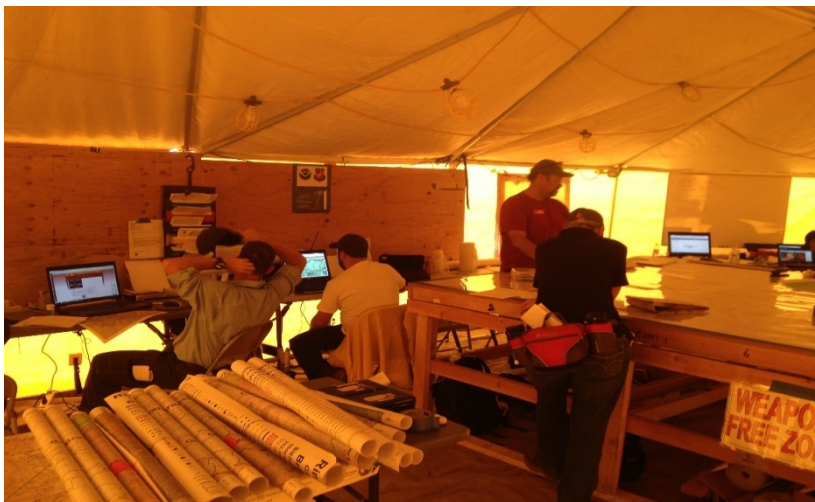
- Organize a forum to allow stakeholders supporting Fire and Smoke products development to interact with key users of the capabilities.
- Understand the current use of geostationary and polar orbiting satellite capabilities in support of Fire and Smoke detection and forecasting mission
- Identify current SNPP/JPSS and new GOES-R Fire and Smoke data and capabilities with the potential to improve support to this mission
- Establish methodologies and procedures for the operational demonstrations of these capabilities
- Following these operational demonstrations, identify the satellite capabilities whose operational impacts are sufficient to warrant transition from research to operations
- Determine required actions for an effective transition of these capabilities to operations that can be maintained over the long term.
- As the Initiative Team met over the months and years, actions were taken to implement these objectives, and new objectives were identified and worked.

Initiative Participants



Name	Organization	Name	Organization
Ravan Ahmadov	CIRES	Sreela Nandi	JPSS
Nazmi Chowdhury	JPSS	Susan O'Neill	USDA Forest Service
Ivan Csiszar	STAR	Li Pan	NOAA Air Resources Lab
Andy Edman	NWS	Brad Pierce	STAR
Evan Ellicott	U of MD	Julie Price	JPSS
Mitch Goldberg	JPSS	Bill Sjoberg	JPSS
Robyn Heffernan	NWS	Ariel Stein	ARL
Eric James	ESRL/GSD	Eric Stevens	GINA
Adam Kochanski	Univ of UT	William Straka	CIMSS
Jan Mandel	Univ of CO-Denver	Jorel Torres	JPSS Training Liaison
Jeff McQueen	STAR	Chris Waigl	UAF

Rim Fire - 2013





Initiative Activities

- Boots on the ground. Personnel visited fires to evaluate what environmental data is used and to provide info on JPSS fire support capabilities.
- Visited key stakeholders, Alaska Fire Service as an example, to help them access JPSS data and products consistently.
- Integrated VIIRS Active Fire and Fire Radiative Power as initial conditions for the HRRR Smoke Model.
- Integrated Air Quality (AQ) specialists into the Initiative Team to ensure AQ issues are addressed.
- Briefed at the last two NWS IMET Conferences to go through with participants the products available on AWIPS Thin Client and new initiatives.
- Evaluated JPSS Products during key fire events such as the Rim Fire in CA, the Fort McMurray Fire in Canada, and the Mims Fire in southern GA.
- Welcomed developers for various smoke models, Blue Smoke as an example, to participate in the F&S Initiative Team to determine how VIIRS could be used in their models.
- And more.....

River Ice and Flooding Initiative Initial Objectives



- Respond to the Galena crisis and provide AK decisionmakers with consistent and timely River Ice and River Flooding Products.
- Once the crisis passed, organize a forum to allow stakeholders supporting River Ice and Flooding product development to interact with the key user communities.
- Provide River Ice and Flooding products consistently to RFCs focused on their particular areas of responsibilities. Increase the number of RFCs participating in the initiative.
- Respond to flooding events throughout the year with flood products as quickly as possible.
- Work with RFCs to assist their users with bringing ice and flood products into their decisionmaking system.
- Establish formal review periods and locations to evaluate the products. Based on user feedback adjust the product algorithms to maximize the effectiveness of River Ice and Flood Products in operational environments.
- As the Initiative Team met over the months and years, actions were taken to implement these objectives, and new objectives were identified and worked.



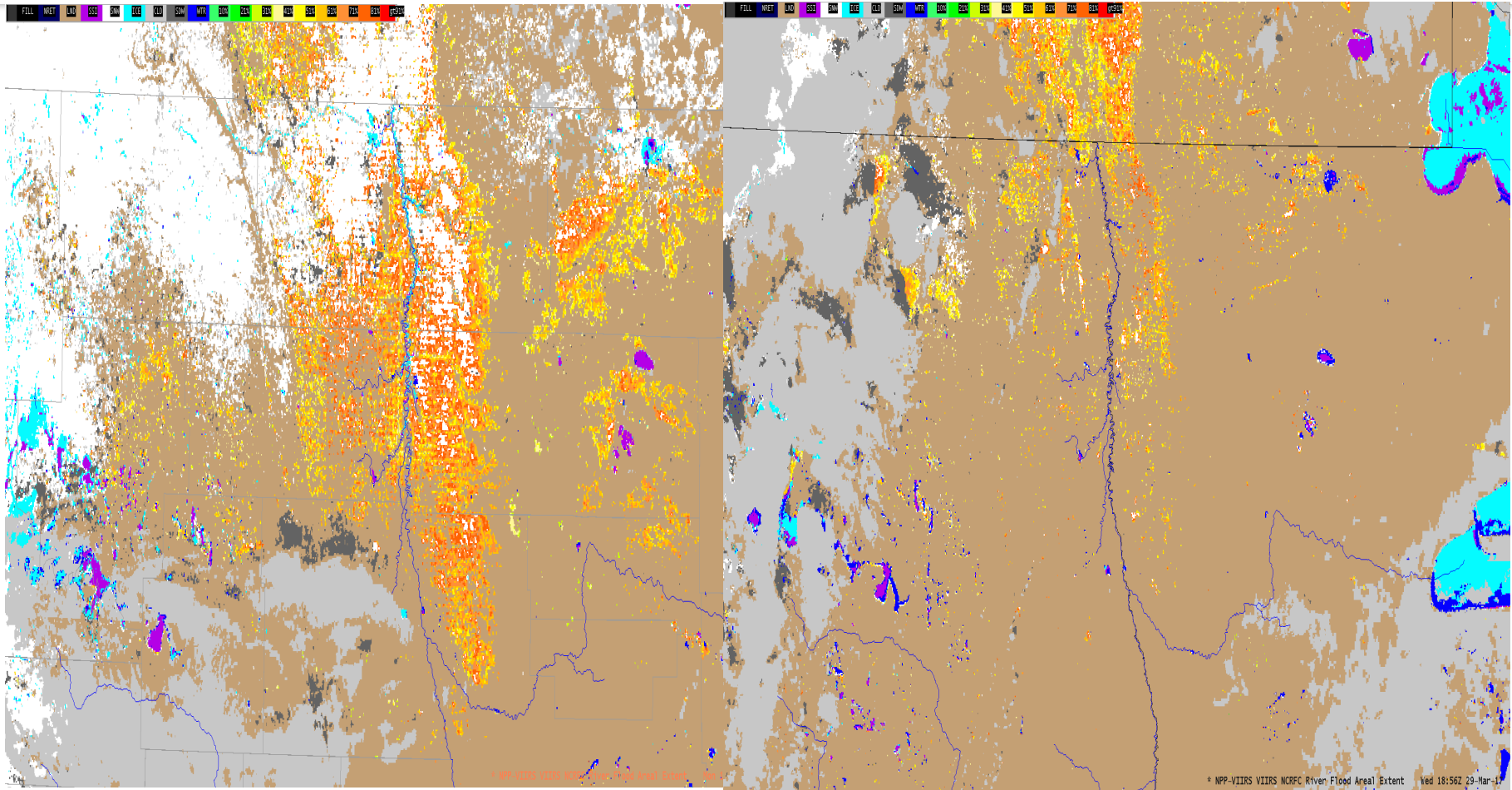
Initiative Participants

Name	Organization	Name	Organization
Paul Alabi	CCNY	Julie Price	JPSS
Jessica Cherry	APRFC	Peter Romanov	CCNY
Reggina Cabrera	SERFC	Fernando Salas	NWC
Gene Derner	MBRFC	Dave Santek	CIMSS
Russ Dengel	CIMSS	Bill Sjoberg	JPSS
Mike DeWeese	NCRFC	Donglian Sun	GMU
Ralph Ferraro	STAR	Greg Story	WGRFC
Tom Heinrichs	GINA	David Streubel	NWS
Jay Hoffman	CIMSS	Tim Szeliga	NWC
Eric Holloway	APRFC	Jorel Torres	CIRA
Sanmei Li	GMU	Nai-Yu Wang	ESSIC

Red River of the North Spring Snowmelt

March 20, 2017

March 29, 2017



- **Lack of inundation indicated ground was thawing and allowing water to infiltrate soil**
- **Flood Area product was also used to validate AMSR2 NASA project results**



Initiative Activities

- The first PGRR Initiative joining River Ice and River Flooding into one effort and applied with great success during the Galena Flood in AK.
- Success resulted in the creation of new initiatives and more NWS River Forecast Center (RFC) involvement. Six RFCs are now regular participants.
- Worked with RFCs to provide their customers with VIIRS products to be included in their decision making systems. USA Corp of Engineer for flooding along the Illinois River as an example.
- Based on feedback from RFCs both the VIIRS River Ice and River Flood products were changed to improve their operational value.
- River Flood products have been used worldwide in response to flooding events.
- Established collaboration with the National Water Center.
- River Ice and Flooding Products key part of capabilities discussed during a NWS visit to Russia.
- Discussed with Coast Guard liaison about the use of the River Ice Product on decisions on ice breaker deployment.
- Established procedures to provide River Flood Product to FEMA to help their response to flooding events.
- And more.....



Arctic Initiative Overview and Objectives

- Goals:
 - Provide a forum for JPSS data and product providers, developers, and users to determine the how JPSS Products can best be used to support Arctic missions.
 - Leverage existing Arctic working groups to identify key data and how it can be most effectively accessed and visualized.
 - Increase use of JPSS/NPP products for Arctic applications
 - Explore experimental products as necessary to meet the needs of the Arctic users.
- Satellite sensors used:
 - Initially, VIIRS with plans to work in CrIS, ATMS, and AMSR2
- Targeted NOAA (and non-NOAA) users:
 - Alaska Sea Ice Program (ASIP), NOAA/NWS
 - NOAA/NWS Weather Forecast Offices (WFOs) in Alaska
 - Geographic Information Network of Alaska (GINA)
 - National Ice Center (NIC)
- Number of projects:
 - No official PGRR project involved

Arctic Focus Areas and Challenges



- Focus Areas

- ✓ Cryosphere

- ✓ Sea Ice Forecasting
 - ✓ River and Ice Flooding
 - ✓ Other Ice Services

- ✓ Weather

- ✓ Real Time Weather Forecasting
 - ✓ Aviation Weather Forecasting

- ✓ Land

- ✓ Permafrost
 - ✓ Oil Exploration

- ✓ Fisheries

- ✓ Location of fish in relation to SST or Ice Cover
 - ✓ Location of fishing vessels

Coastal and Oceans Initiative Objectives



■ Goal(s):


- Support NOAA's goals of Climate Adaptation and Mitigation, Weather-Ready Nation, Healthy Oceans, and Resilient Coastal Communities and Economies by monitoring, understanding and predicting ocean, coastal and inland water processes, both physical and biological.
- Support activities that provide users with fit-for-purpose, accurate, consistent and timely ocean data and derived products from JPSS-VIIRS.

■ Overarching Milestone:

- Facilitate the use of VIIRS ocean data products
 - within each NOAA Line Office for their operational forecasts or research needs.
 - outside of NOAA by other US agencies, academic researchers, resources managers, commercial sector users, international partners and the general public who use satellite data products or downstream products and/or knowledge derived from satellite data (e.g., forecasts)

NOAA CoastWatch/OceanWatch L2 VIIRS OC Space and Time Search





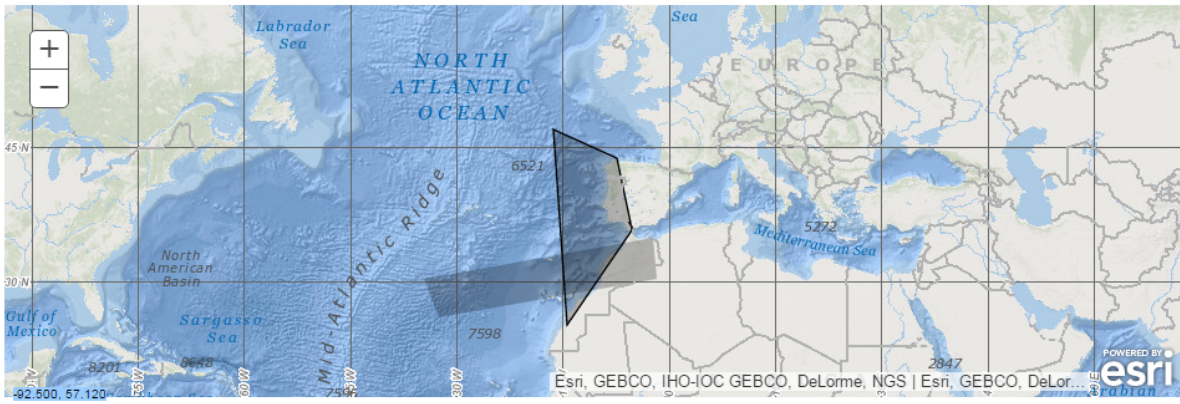
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

S-NPP VIIRS Science Quality Ocean Color Data (L2)

Draw:

Apr 23, 2017 - Apr 25, 2017

Note: Science quality ocean color data from VIIRS is delayed by 15 days. The L2 datasets contain 5 nLw bands, chlorophyll-a, KdPAR, and Kd490. Use the FTP List button to generate a list of URLs for batch downloads.



Esri, GEBCO, IHO-IOC GEBCO, DeLorme, NGS | Esri, GEBCO, DeLorme, NGS

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2017-04-24 (114) 12:17:23 — Draw on map

2017-04-24 (114) 12:18:48 — Draw on map

Region: L2
Sensor: VIIRS_sci
Prod

File Edit Format View Help

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https://coastwatch.star.nesdis.noaa.gov/cw_html/cw_polygon_search.html#searchbox

River Ice and Flooding Initiative

Accomplishments

- ✓ A River Ice and Flooding Telecon was held on 22 Jun.
- ✓ The team were ready to help FEMA in their response to Tropical Storm Cindy and possible flooding. FEMA did not stand. Sanmei has received 17 requests for flood products in 2017 so far.
- ✓ Summarized the RI&F Initiative Session of the JPSS Project Review that took place on 23 May. Reviewers comments will be assimilated and feedback provided to the initiatives.

Key Milestones

Milestone	Target Date	Completed	Notes
Evaluate new River Ice Product during the AK Spring Break-up	Discussed at Jun Telecon	22 Jun	AK Rivers had a pretty clean break-up. River ice product helped track progress
Collaborative Team including the Hydrology Initiative, the River Ice and Flooding Initiative and the National Water Center (NWC)	Discuss at Jul Telecon		First telecon held on 10 Jul
Determine how to support FEMA with JPSS Capabilities	Discussed at Jun Telecon	22 Jun	Chris Donohue (FEMA Liaison) established a process with CIMSS to routinely get VIIRS flood products

Future Plans

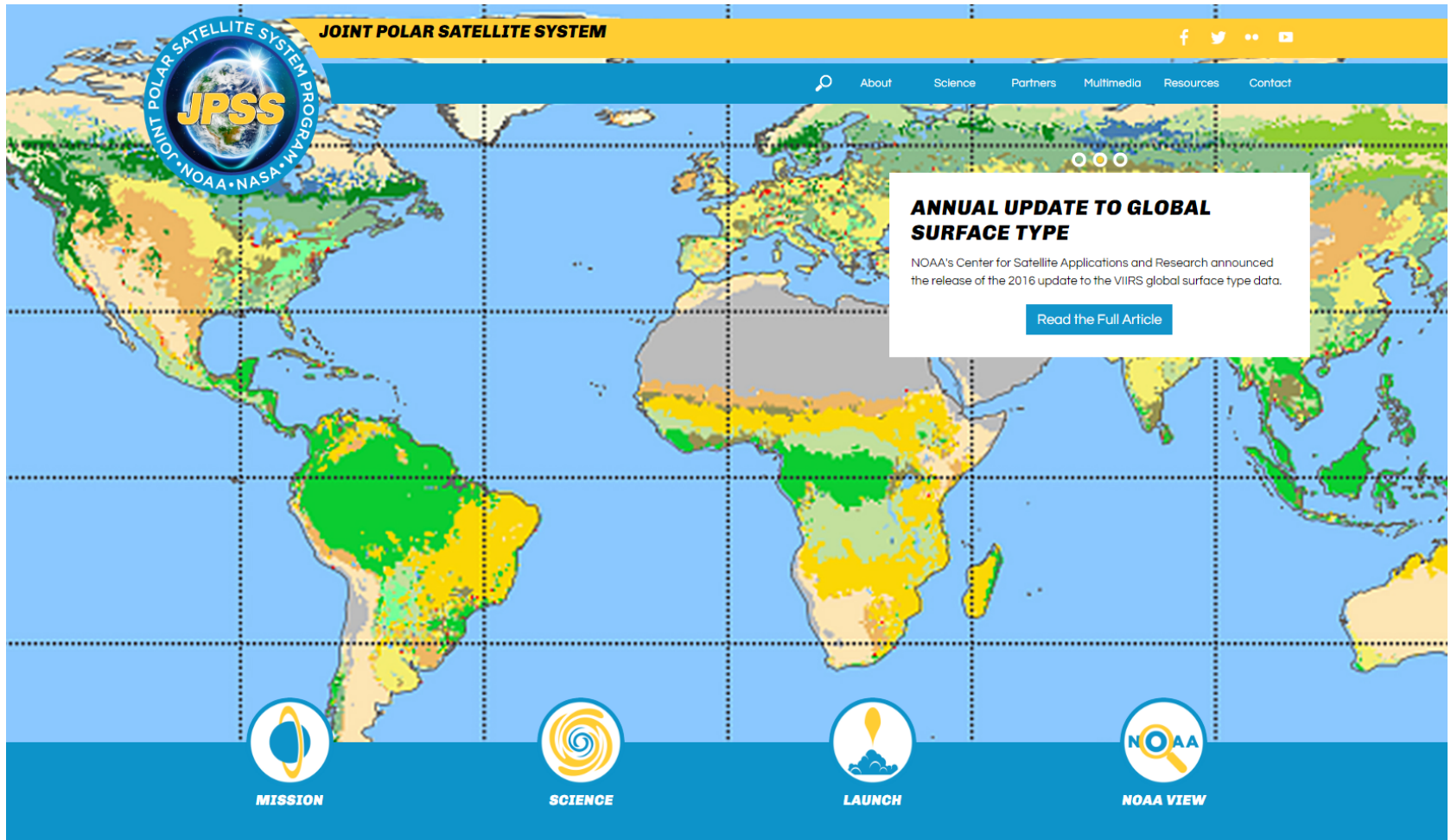
- ✓ Discussed the planned Arctic Summit in May 2018 and that the RI&F Initiative would have a full day of discussions.
- ✓ Requested a summary of the value of the River Ice and Flooding Products from the NWS RFCs for the winter of 2016-2017.
- ✓ River Ice and Flooding Telecon scheduled for 27 Jul.

Communicating Initiative Information



- Initiative periodic meetings – invite interested parties to consider joining the initiative team.
- Participation in national/international working groups.
- Oral and poster presentations at conferences.
- Visits to user organizations.
- Participation in field campaigns, testbed evaluations, and operational exercises.
- Monthly JPSS Science Seminars.
- Articles in technical journals.
- JPSS Website.
- Word-of-mouth.

For More Information on the JPSS Program (WWW.JPSS.NOAA.GOV)





Discussion Topics

- **JPSS Initiative Program.**
- **JPSS Specific Initiatives.**
- **Participation in JPSS Initiatives would be helpful to them to meet their mission.**
- **Has the JPSS Program has provided sufficient background information to effectively use its capabilities (to include training).**
- **Your feedback on initiatives to evaluate for future program changes?**
- **Can the JPSS Initiative approach could be replicated in other meteorological communities.**